

CLAIMS

1. A vehicle wheel bearing comprising:
 - a) a vehicle-wheel-bearing monolithic shaft which includes an inboard inner race and an outboard inner race; and
 - b) a vehicle-wheel-bearing monolithic outer race assembly which surrounds the shaft and which includes an outboard outer race and an inboard outer race.
2. A vehicle wheel bearing comprising:
 - a) a vehicle-wheel-bearing monolithic, non-rotatable shaft which is attachable to a vehicle suspension component and which includes an inboard inner race and an outboard inner race; and
 - b) a vehicle-wheel-bearing monolithic, rotatable outer race assembly which is attachable to a vehicle wheel, which surrounds the shaft, and which includes an outboard outer race and an inboard outer race.
3. A vehicle wheel bearing assembly comprising:
 - a) a vehicle knuckle member which has a bore, which has a substantially-outboard-facing surface and a substantially-inboard-facing surface; and
 - b) a vehicle wheel bearing having:
 - (1) a monolithic, non-rotatable shaft which includes an outboard inner race and a shoulder, wherein the shaft is disposed in the bore, wherein the shoulder abuts the substantially-outboard-facing surface, and wherein the shaft is attached to the vehicle knuckle member against the substantially-inboard-facing surface;
 - (2) an inboard inner race; and
 - (3) a monolithic, rotatable outer race assembly which surrounds the shaft and which includes an outboard outer race and an inboard outer race.

4. The vehicle wheel bearing assembly of claim 3, wherein the shaft and the inboard inner race define a monolithic structure.
5. The vehicle wheel bearing assembly of claim 3, wherein the shaft has a deformed portion which abuts the substantially-inboard-facing surface.
6. The vehicle wheel bearing assembly of claim 5, wherein the shaft and the inboard inner race define a monolithic structure.
7. The vehicle wheel bearing assembly of claim 5, wherein the outer race assembly is disposed radially outwardly apart from the shaft creating a bearing cavity, wherein the bearing cavity has a substantially-circular outboard opening; and also including an end cap which is attached to the outer race assembly and which has a portion covering the outboard opening, wherein the portion is at least partially disposed in the bearing cavity, and wherein the portion has a substantially toroidal shape.
- 5 8. The vehicle wheel bearing assembly of claim 5, wherein the outer race assembly is disposed radially outwardly apart from the shaft creating a bearing cavity, wherein the bearing cavity has a substantially-circular inboard opening, and also including an inboard seal having a member attached to the outer race, wherein the member has a first portion substantially covering the inboard opening and has a second portion extending radially outwardly of the outer race, and wherein the second portion defines a target ring for an anti-lock-braking-system speed sensor.
- 5 9. The vehicle wheel bearing assembly of claim 5, wherein the outer race is disposed radially outwardly apart from the shaft creating a bearing cavity, wherein the bearing cavity has a substantially-circular outboard opening, also including an anti-lock-braking-system (ABS) speed sensor attached to the shaft proximate the outboard opening;; and further including a target ring which is

attached to the outer race and which has a portion disposed to be sensed by the ABS speed sensor.

10. The vehicle wheel bearing assembly of claim 9, wherein the shaft has a central bore having an outboard end and an inboard end, and also including a wire connector disposed at the inboard end, and further including wiring which is disposed in the central bore and which connects the speed sensor and the wire connector.
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11. The vehicle wheel bearing assembly of claim 10, also including an end cap which is attached to the outer race assembly and which covers the outboard opening of the bearing cavity and the outboard end of the central bore.
12. The vehicle wheel bearing assembly of claim 11, wherein the target ring is an extension of the end cap.
13. The vehicle wheel bearing assembly of claim 3, also including a retention nut, wherein the shaft has a threaded end, and wherein the retention nut is threadably attached to the threaded end and abuts the substantially-inboard-facing surface.
14. The vehicle wheel bearing assembly of claim 13, wherein the shaft and the inboard inner race define a monolithic structure.
15. The vehicle wheel bearing assembly of claim 13, wherein the outer race assembly is disposed radially outwardly apart from the shaft creating a bearing cavity, wherein the bearing cavity has a substantially-circular outboard opening; and also including an end cap which is attached to the outer race assembly and which has a portion covering the outboard opening, wherein the portion is at least partially disposed in the bearing cavity, and wherein the portion has a substantially toroidal shape.
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16. The vehicle wheel bearing assembly of claim 13, wherein the outer race assembly is disposed radially outwardly apart from the shaft creating a bearing cavity, wherein the bearing cavity has a substantially-circular inboard opening, and also including an inboard seal having a member attached to the outer race, 5 wherein the member has a first portion substantially covering the inboard opening and has a second portion extending radially outwardly of the outer race, and wherein the second portion defines a target ring for an anti-lock-braking-system speed sensor.

17. The vehicle wheel bearing assembly of claim 13, wherein the outer race is disposed radially outwardly apart from the shaft creating a bearing cavity, wherein the bearing cavity has a substantially-circular outboard opening, also including an anti-lock-braking-system (ABS) speed sensor attached to the shaft 5 proximate the outboard opening; and further including a target ring which is attached to the outer race and which has a portion disposed to be sensed by the ABS speed sensor.

18. The vehicle wheel bearing assembly of claim 17, wherein the shaft has a central bore having an outboard end and an inboard end, and also including a wire connector disposed at the inboard end, and further including wiring which is disposed in the central bore and which connects the speed sensor and the wire 5 connector.

19. The vehicle wheel bearing assembly of claim 18, also including an end cap which is attached to the outer race assembly and which covers the outboard opening of the bearing cavity and the outboard end of the central bore.

20. The vehicle wheel bearing assembly of claim 19, wherein the target ring is an extension of the end cap.

21. A vehicle wheel bearing comprising;

- a vehicle-wheel-bearing shaft having an inner race;

(b) a vehicle-wheel-bearing outer race assembly which has an outer race and which is disposed radially outwardly apart from the shaft creating a bearing cavity, wherein the bearing cavity has a substantially-circular outboard opening; and

(c) an end cap which is attached to the outer race assembly and which has a portion covering the outboard opening, wherein the portion is at least partially disposed in the bearing cavity, and wherein the portion has a substantially toroidal shape.

22. A vehicle wheel bearing comprising;

(a) a vehicle-wheel-bearing non-rotatable shaft having an inner race;

(b) a vehicle-wheel-bearing rotatable outer race assembly which includes an outer race and which is disposed radially outwardly apart from the shaft creating a bearing cavity, wherein the bearing cavity has a substantially-circular inboard opening; and

(c) an inboard seal having a member attached to the outer race assembly, wherein the member has a first portion substantially covering the inboard opening and has a second portion extending radially outwardly of the outer race assembly, and wherein the second portion defines a target ring for an anti-lock-braking-system speed sensor.

23. A vehicle wheel bearing comprising;

(a) a vehicle-wheel-bearing non-rotatable shaft having an inner race;

(b) a vehicle-wheel-bearing rotatable outer race assembly which has an outer race and which is disposed radially outwardly apart from the shaft creating a bearing cavity, wherein the bearing cavity has a substantially-circular outboard opening;

(c) an anti-lock-braking-system (ABS) speed sensor which is disposed in the bearing cavity and which is attached to the shaft proximate the outboard opening; and

10 (d) a target ring which is disposed in the bearing cavity, which is attached to the outer race assembly, and which has a portion disposed to be sensed by the ABS speed sensor.

24. The vehicle wheel bearing of claim 23, wherein the shaft has a central bore having an outboard end and an inboard end, and also including a wire connector disposed at the inboard end, and further including wiring which is disposed in the central bore and which connects the ABS speed sensor and the wire connector.

5 25. The vehicle wheel bearing of claim 24, also including an end cap which is attached to the outer race assembly and which covers the outboard opening of the bearing cavity and the outboard end of the central bore.

26. The vehicle wheel bearing of claim 25, wherein the target ring is an extension of the end cap.